

**DOE/ID-10337**

**Revision 0**

**May 2001**



U.S. Department of Energy  
Idaho Operations Office

## ***Waste Management Plan for Operable Unit 3-13, Group 6, Buried Gas Cylinders***



Idaho National Engineering and Environmental Laboratory

# **Waste Management Plan for Operable Unit 3-13, Group 6, Buried Gas Cylinders**

**Published May 2001**

**Prepared for the  
U.S. Department of Energy  
Idaho Operations Office**

## **ABSTRACT**

This waste management plan describes the management of wastes generated during the remedial action of Waste Area Group 3, Operable Unit 3-13, Group 6, Buried Gas Cylinders, site CPP-84. Soil sampling wastes generated at CPP-94 are also managed by this plan. Management of all wastes is based on the assumption that there will be no radiological or chemical contamination present. All wastes are expected to be nonhazardous except acetylene. Cylinders containing inert gases will be vented to the atmosphere. Empty inert gas cylinders will be rendered inoperable and land disposed at the Idaho National Engineering and Environmental Laboratory Landfill Complex. Acetylene will be treated by thermal or chemical oxidation. Empty acetylene cylinders will be shipped off-Site for disposal. Other wastes expected to be generated include disposable personal protective equipment and nonregulated solid waste. All waste management activities will be coordinated with Waste Generator Services.



# CONTENTS

|  |     |
|--|-----|
| ABSTRACT .....   | iii |
| ACRONYMS.....  | vii |
| 1. INTRODUCTION.....   | 1-1 |
| 1.1 Purpose .....  | 1-1 |
| 2. DESCRIPTION OF REMEDIATION ACTIVITIES .....   | 2-1 |
| 3. PROJECTED WASTE STREAMS .....   | 3-1 |
| 3.1 CPP-84 Wastes .....  | 3-1 |
| 3.1.1 Inert Gases (Nitrogen, Oxygen, Argon, Carbon Dioxide,<br>and Compressed Air) ..... | 3-1 |
| 3.1.2 Empty, Dismantled Inert Gas Cylinders .....  | 3-1 |
| 3.1.3 Flammable Gases (Acetylene) .....  | 3-1 |
| 3.1.4 Empty Acetylene Cylinders .....  | 3-2 |
| 3.1.5 Personal Protective Equipment and Miscellaneous<br>Non-Contaminated Waste .....    | 3-2 |
| 3.1.6 Soil Sampling Wastes .....   | 3-2 |
| 3.1.7 New Waste Streams .....  | 3-2 |
| 4. PROJECTED WASTE STREAM QUANTITIES AND CHARACTERISTICS.....                            | 4-1 |
| 4.1 CPP-84 Wastes .....  | 4-1 |
| 4.1.1 Inert Gases (Nitrogen, Oxygen, Argon, Carbon Dioxide, and<br>Compressed Air) ..... | 4-1 |
| 4.1.2 Empty, Dismantled Inert Gas Cylinders .....  | 4-1 |
| 4.1.3 Flammable Gases (Acetylene) .....  | 4-1 |
| 4.1.4 Empty Acetylene Cylinders .....  | 4-2 |
| 4.1.5 Personal Protective Equipment and Miscellaneous<br>Non-Contaminated Wastes .....   | 4-2 |
| 4.1.6 Soil Sampling Waste.....   | 4-2 |
| 5. PRELIMINARY WASTE CHARACTERIZATION.....   | 5-1 |
| 6. WASTE STORAGE AND INSPECTION.....   | 6-1 |
| 6.1 Acetylene and Inert Gases .....  | 6-2 |
| 6.2 Empty, Dismantled Inert Gas Cylinders .....  | 6-2 |
| 6.3 Empty Acetylene Cylinders .....  | 6-2 |
| 6.4 Personal Protective Equipment and Miscellaneous Noncontaminated Waste.....           | 6-2 |

|       |  |      |
|-------|--|------|
| 6.5   | Soil Sampling Wastes .....   | 6-2  |
| 6.6   | New Wastes .....   | 6-3  |
| 7.    | WASTE STREAM TREATMENT AND DISPOSAL .....                                      | 7-1  |
| 7.1   | Waste Management and Treatment .....   | 7-1  |
| 7.1.1 | Inert Gases .....  | 7-1  |
| 7.1.2 | Acetylene .....  | 7-1  |
| 7.1.3 | Empty Inert Gas Cylinders .....  | 7-1  |
| 7.1.4 | Empty Acetylene Cylinders .....  | 7-1  |
| 7.1.5 | Personal Protective Equipment and Miscellaneous<br>Noncontaminated Waste ..... | 7-2  |
| 7.1.6 | New Wastes .....   | 7-2  |
| 8.    | WASTE MINIMIZATION .....   | 8-1  |
| 8.1   | Recycling .....  | 8-1  |
| 8.2   | Contamination Control .....  | 8-1  |
| 9.    | WASTE PACKAGING AND SHIPPING .....   | 9-1  |
| 10.   | RECORDKEEPING AND REPORTING .....  | 10-1 |
| 10.1  | Waste Generation and Characterization Records .....                            | 10-1 |
| 10.2  | Waste Storage .....  | 10-1 |
| 10.3  | Waste Shipment .....   | 10-2 |
| 10.4  | Waste Treatment and Disposition .....  | 10-2 |
| 11.   | REFERENCES .....   | 11-1 |

## FIGURES

|      |  |     |
|------|--|-----|
| 1-1. | Location of Site CPP-84 and CPP-94 ..... | 1-2 |
| 6-1. | Standard CERCLA waste label. ....        | 6-1 |

## TABLES

|      |   |     |
|------|---|-----|
| 5-1. | CPP-84 waste quantities and classifications .....             | 5-1 |
| 6-1. | Storage, treatment, and disposal methods for new wastes ..... | 6-4 |

## **ACRONYMS**

|        |   |
|--------|---|
| ARAR   | applicable or relevant and appropriate requirement                    |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act |
| CFR    | Code of Federal Regulations   |
| COPC   | contaminant of potential concern                                      |
| CPP    | Chemical Processing Plant   |
| CRV    | cylinder recovery vessel  |
| CSA    | CERCLA Storage Area   |
| DOE    | U.S. Department of Energy   |
| EPA    | U.S. Environmental Protection Agency                                  |
| ICPP   | Idaho Chemical Processing Plant                                       |
| IWTS   | INEEL Waste Tracking System   |
| INEEL  | Idaho National Engineering and Environmental Laboratory               |
| INTEC  | Idaho Nuclear Technology and Engineering Center                       |
| LPC    | liquified petroleum gas   |
| MCP    | Management Control Procedure  |
| OU     | operable unit   |
| P&T    | Packaging and Transportation Organization                             |
| POC    | point of contact  |
| PPE    | personal protective equipment   |
| RCRA   | Resource Conservation and Recovery Act                                |
| RD/RA  | remedial design/remedial action                                       |

|       |  |
|-------|--|
| RRWAC | reusable property, recyclable materials, and waste acceptance criteria |
| SSA   | Staging and Storage Annex  |
| TSDF  | treatment, storage and disposal facility                               |
| VSS   | valve sampling station   |
| WGS   | Waste Generator Services   |



# **Waste Management Plan for Operable Unit 3-13, Group 6, Buried Gas Cylinders**

## **1. INTRODUCTION**

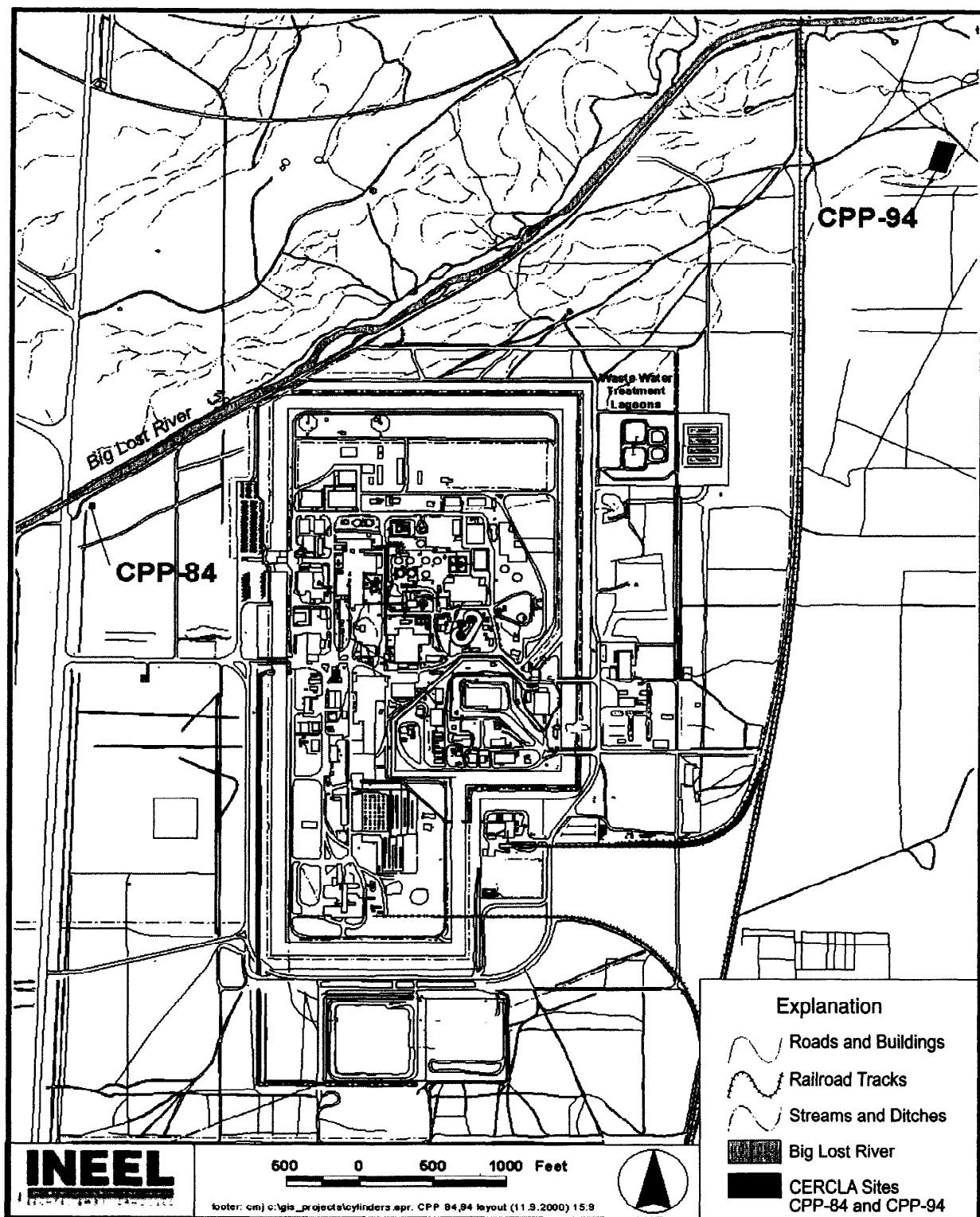
The *Remedial Design/Remedial Action (RD/RA) Work Plan* (DOE-ID 2000a) identifies and describes in detail the work elements required to remove and manage compressed gas cylinders that have been land disposed at CPP-84. The removal action is identified in the *Final Record of Decision for Operable Unit 3-13* (DOE-ID 1999). This waste management plan describes the management of wastes generated during the remedial action.

CPP-84 is located between Idaho Nuclear Technology and Engineering Center (INTEC) and Lincoln Boulevard and about 60 ft south of the Big Lost River. The site consists of a trench where compressed gas cylinders were disposed after initial construction of INTEC (formerly known as the Idaho Chemical Processing Plant or ICPP) in 1952. It is estimated that between 40 and 100 compressed gas cylinders were buried at this location. Anecdotal evidence including maintenance logs from Igloo 638, chemical index sheets from the 660 Cylinder Dock, and interviews with INTEC personnel, indicates that the cylinders contain acetylene, compressed air, argon, carbon dioxide, helium, nitrogen, and oxygen.

The horizontal and vertical extent of the burial trench has been estimated using ground-penetrating radar. The trench is currently staked and measures approximately 8 m x 26 m (25 ft x 85 ft) and approximately 2 m (5 ft) deep. Figure 1-1 shows the location of CPP-84 in relation to the INTEC.

### **1.1 Purpose**

The purpose of this plan is to describe the types, quantities, and disposition of wastes generated during cylinder removal activities at CPP-84. Waste management activities will be conducted in accordance with all applicable Idaho National Engineering and Environmental Laboratory (INEEL) procedures. This plan provides detailed actions for all phases of the waste management process for all waste streams expected to be generated. Project management can use this plan in combination with site procedures to effectively manage waste in compliance with applicable regulations.



**Figure 1-1.** Location of Site CPP-84 and CPP-94.

## 2. DESCRIPTION OF REMEDIATION ACTIVITIES

Remedial activities that will generate waste are identified in this section. Comprehensive waste management for each waste stream is described in Section 3.

- Remediation activities at CPP-84 consists of cylinder excavation and segregation; cylinder content sampling and analysis; and soil sampling and analysis. Based on the analytical results of cylinder contents, the method of treatment will be determined. It is anticipated that treatment methods will include venting of inert gasses and thermal or chemical oxidation of flammable (acetylene) gasses.
- Soil data will be collected at CPP-84 and CPP-94 at the conclusion of cylinder removal activities. The purpose of this data collection is to provide a characterization of the excavation bottom. Soil samples will be collected and analyzed for contaminants of potential concern (COPCs) at an offsite laboratory. This activity is detailed in the *Preliminary Characterization Plan for OU-13, Group 6, RD/RA Buried Gas Cylinders, CPP-84 and CPP-94* (DOE-ID 2000b).

### **3. PROJECTED WASTE STREAMS**

Cylinder removal activities at CPP-84 are expected to generate six waste streams. Other waste streams may be generated if unusual situations develop, i.e., detection of radiological contamination and the presence of toxic gases. These wastes will be managed as “new waste streams” and are addressed in Section 3.1.7. Specific waste streams are described below.

Post-removal characterization activities at CPP-94 will generate personal protective equipment (PPE) and other miscellaneous, noncontaminated waste.

All waste streams will be characterized as required by Department of Energy (DOE) orders and in accordance with 40 CFR 262.11. Waste Generator Services (WGS) will perform hazardous waste determinations on all waste streams. Anticipated wastes are

- Inert gases (nitrogen, oxygen, argon, carbon dioxide, and compressed air)
- Empty, dismantled inert gas cylinders
- Flammable gases (acetylene)
- Empty acetylene cylinders
- Personal protective equipment and miscellaneous noncontaminated wastes
- Soil sampling materials.

#### **3.1 CPP-84 Wastes**

##### **3.1.1 Inert Gases (Nitrogen, Oxygen, Argon, Carbon Dioxide, and Compressed Air)**

Records indicate that the cylinders buried at CPP-84 were used during the initial construction of INTEC, completed in 1952. These records include maintenance logs from Igloo 638, chemical index sheets from the 660 Cylinder Dock, and interviews with INTEC personnel. The compilation of this information identifies the presence of argon, helium, carbon dioxide, breathing air, oxygen, and nitrogen, and acetylene. It is not known whether the cylinders were buried because they were empty, partially empty, leftover/unused, or damaged. These wastes will be managed by venting the atmosphere.

##### **3.1.2 Empty, Dismantled Inert Gas Cylinders**

After inert gases are vented, the resulting empty cylinders will be managed as industrial waste. Valve components are expected to be made of brass or bronze; these will be evaluated for recycling. Cylinders are assumed to be made of carbon steel.

##### **3.1.3 Flammable Gases (Acetylene)**

A large number of acetylene cylinders may be present at CPP-84. For waste management purposes, 50 cylinders are estimated to be buried at the site. Acetylene is not an environmental hazard but is considered a simple asphyxiant and an explosive hazard. Acetylene gas will be thermally oxidized (or flared).

#### **3.1.4 Empty Acetylene Cylinders**

Empty acetylene cylinders will be generated once all acetylene has been removed. Empty acetylene cylinders may contain nonliquid residual acetone and some form of asbestos. The acetone and asbestos was used in the stabilizing matrix of the cylinders. It is anticipated that if asbestos were present, it would still be contained within the acetylene containers in a bound and non-friable state.

#### **3.1.5 Personal Protective Equipment and Miscellaneous Noncontaminated Waste**

PPE waste consisting of gloves, Nomex® coveralls, boots, and tape may be generated during cylinder removal and management activities. Gloves will be made of leather; surgical gloves or cloth gloves may be used as inner liners. Duct tape is used to secure the various layers of PPE. Miscellaneous wastes such as trash, labels, paper and other miscellaneous debris may also be generated. Similar wastes will be generated during post-removal soil sampling at CPP-84 and CPP-94.

If radiological contamination is encountered, PPE modifications are likely as determined by project Radiation control and health and safety personnel. Contamination control and decontamination supplies may include blotter paper, plastic sheeting and sleeving, bags, rags, tissues, masslin cloth, paper smears and tape.

#### **3.1.6 Soil Sampling Wastes**

Soil sampling of the excavation bottoms at each site will generate a small amount of noncontaminated waste. This industrial waste will consist of materials including latex gloves, tape, aluminum foil, paper, plastic spoons and spatulas, and absorbent material.

#### **3.1.7 New Waste Streams**

Any new wastes streams that may be generated (as well as those identified in Table 5-1) must be identified and characterized. New wastes would consist of wastes generated by changes in remediation strategies, hazardous material spills, changes in radiological conditions, contaminated soils, discovery of unexpected types of gas cylinders, and other low probability events and circumstances. If any acetylene cylinders have ruptured or are ruptured during excavation, friable asbestos waste may be generated.

New waste streams will be managed in accordance with Section 5.

## **4. PROJECTED WASTE STREAM QUANTITIES AND CHARACTERISTICS**

Anticipated quantities and classifications of each waste stream are identified in the subsections below. At CPP-84, estimates of gas volumes are difficult as the number, cylinder capacity, and actual amount of gas in cylinders are unknown. Therefore, for waste management purposes, the following assumptions are used.

CPP-84 assumptions are as follows:

- 50% of total cylinders contain inert gases
- 50% of the total cylinders contain acetylene gas
- 100 construction gas cylinders are present
- No radiological or chemical contamination is present in the soil.

These are conservative and bounding assumptions that provide a waste management envelope encompassing the expected types and amounts of each type of gas expected to be present. The classification and quantities of each type of waste anticipated to be generated at each site are summarized in Table 5-1.

Only wastes that are certain to be generated or have a high probability of being generated are addressed in this section. It is not practical to try to estimate generation volumes of wastes that may be created in the event of unexpected circumstances, i.e., diesel oil spill and presence of radiological contamination.

### **4.1 CPP-84 Wastes**

#### **4.1.1 Inert Gases (Nitrogen, Oxygen, Argon, Carbon Dioxide, and Compressed Air)**

Existing records do not identify the number of each type of inert gas present at CPP-84. The project will use a conservative estimate of 50% of the cylinders contain inert gases. The remaining 50% of the cylinders are assumed to contain acetylene. Inert gases expected to be present include oxygen, nitrogen, carbon dioxide, argon, compressed air, and helium. Quantities of inert gases are estimated to be a total of 500 kg for each type of gas including the weight of the cylinders.

#### **4.1.2 Empty, Dismantled Inert Gas Cylinders**

It is assumed that approximately 50 empty inert gas cylinders will be generated. Cylinders will be rendered inoperable by removing valves and either cutting or puncturing each cylinder. Empty cylinders will be stored in a weather-protected area until disposed in the INEEL Landfill Complex as industrial waste. Empty containers are defined in 40 CFR 261.7.

#### **4.1.3 Flammable Gases (Acetylene)**

Fifty cylinders of acetylene are estimated to be present at CPP-84. The total amount of acetylene is estimated at 900 kg. Acetylene is an ignitable gas as defined by 40 CFR 261.21. Acetylene gas is a potential flammable hazard if the cylinder is punctured.

#### **4.1.4 Empty Acetylene Cylinders**

It is estimated that 50 empty acetylene cylinders will need to be disposed. Any asbestos present in intact cylinders should be nonfriable. Residual acetone may be present in the solidification matrix; however, the acetone is not in liquid form and is not flammable. Empty acetylene cylinders will be disposed at an offsite facility.

#### **4.1.5 Personal Protective Equipment and Miscellaneous Non-Contaminated Wastes**

There will be approximately 15 days of field operations during the excavation of cylinders at CPP-84. This activity will generate PPE, paper, and other noncontaminated trash. The total amount of this waste is not expected to exceed 9 m<sup>3</sup> (30 ft<sup>3</sup>). Miscellaneous noncontaminated waste such as paper, sampling spoons, and other soil sampling materials will be generated during the post-removal characterization activities. This will be generated at CPP-84 and CPP-94.

#### **4.1.6 Soil Sampling Waste**

Soil sampling waste will be generated from the post-removal soil sampling. The waste will be industrial waste. Approximately 2.5 m<sup>3</sup> (8 ft<sup>3</sup>) will be generated at each site.